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January 9, 1995

94-102
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FEDERAL COMMUNICATIONS COMMISSION
CHIEF OF SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Revision of the Commission's rules to ensure
compatibility with enhanced 911 emergency calling systems

Dear Mr. Caton:

Transmitted herewith are an original and nine (9) copies of the reply
comments of Westinghouse Electric Corporation in the above referenced
proceeding.

Please direct any inquiries regarding this matter to the undersigned.

Sincerely,

Stephen A. Hildebrandt
Chief Counsel

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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JAN 9 1995

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of

Revision of the Commission's rules
to ensure compatibility with
enhanced 911 emergency calling systems

)
) CC Docket No. 94-102

) RM-8143
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COMMENTS OF WESTINGHOUSE ELECTRIC CORPORATION

Westinghouse Electric Corporation hereby submits its comments with respect to the Notice of Proposed Rulemaking (the "Notice") in the above-captioned proceeding, in which the Commission proposes rules and policies governing enhanced 911 emergency calling systems.

Westinghouse's Electronic Systems Business Unit is a global leader in electronic systems, achieving \$2.8 billion in sales during 1993. A growing business within Electronic Systems is its Communications Division which provides mobile satellite communications systems and products, communications value-added services, HDTV broadcast transmission equipment, and digital audio broadcasting technology. These businesses include manufacture and design of fixed site and mobile terminal hardware, communications systems integration, and provision of wireless communications services based on terrestrial and satellite infrastructures.

Westinghouse's Interest in 911 Emergency Calls Over Wireless Networks

Westinghouse supports the need and utility of wireless 911 Emergency Calling Systems. Westinghouse has certain capabilities and technologies that could provide solutions for various proposed upgrades to existing wireless 911 Emergency Service.

Westinghouse is currently engaged in the development and deployment of complex mobile communications networks that provide wireless communications via geostationary and low earth orbit satellites. These systems are custom designs based on customer specifications. These systems, some targeted for operation within the next calendar year, have been implemented with a high degree of custom software which allows adaptation for future capabilities such as enhanced 911 service as selected by the service provider. Westinghouse also develops and manufactures for sale mobile satellite terminals for voice, data, and facsimile applications. Westinghouse is under contract to provide a variety of value-added communications services including roadside assistance, emergency response, stolen vehicle recovery, etc. which utilize a variety of wireless communications networks and position location technologies.

The geostationary satellite communications system that Westinghouse has developed allows an individual to call from anywhere in the United States to another mobile terminal or to any standard telephone connected to a terrestrial public switched telephone network (PSTN) or private network (PN). The system as currently specified does not specifically provide for 911 service or enhanced 911 services as outlined in the Notice. However, at the service provider's discretion, it would be possible with appropriate design and implementation modifications to adapt the system to support many of the requirements of the Notice. As an example, the mobile terminals developed for the MSAT system has an option that supports global positioning system (GPS) geolocation as well as voice communication in the same device.

Furthermore, MSAT as well as other wireless networks coupled with an Emergency Response Center could provide a ubiquitous enhanced 911 coverage of the entire US.

Difference Between Terrestrial and Satellite Wireless Communications

There is a significant difference between the ability of terrestrial based and satellite based wireless services to provide even basic access. Terrestrial based systems, such as cellular or PCS, by virtue of their confined coverage area are easily able to provide basic 911. Satellite based systems, however, will have one ground station servicing a large area of the US, and covering the jurisdictions of

thousands of Public Service Answering Points (PSAPs). In this case, the connection to the correct PSAP is not straightforward. The receipt of basic 911 calls via satellite contains no information to correlate it with the correct PSAP. Moreover, given that mobile satellite service providers for the most part are start-up businesses, caution must be taken to not over-burden them with regulations that will raise costs, lower user demand, and negatively impact their ability to succeed in providing basic service.

In general, this Notice addresses the key issues for 911 service as it applies to terrestrial phone networks. It begins to address the future of the cellular industry. However, because of the nature of satellite based communications that allow calls-from-anywhere-to-anywhere mobile communications, the historical thrust and near term enhancements for enhanced 911 service should be reevaluated. The key concern is that of determining the physical location of the emergency caller. It is suggested that a total system look be initiated and a "standard" public domain locator system be determined that has sufficient accuracy to meet the needs of the 911 PSAPs. For the three dimensional requirement within buildings, it is suggested that ancillary in-building systems be considered or locator devices for en-route rescue teams be considered. From a total population cost this moves the burden of the emergency locator feature(s) from the individual terminal owner/user to the places and organizations that will need the locator capability. Another issue is one of reserve bandwidth and reserve system element capacity for just 911 service. From a revenue generation perspective, this translates into a lower potential revenue gain. The method of financing 911 should be considered in this regard.

Nationwide Emergency Response Center

Westinghouse suggests that one or more emergency nationwide response centers be established to connect to PSAPs for these mobile satellite systems as well as other interested wireless networks. The service would provide the location of wireless users (if equipped with appropriate position location capability) to PSAPs, the Coast Guard and other search and rescue organizations. Response system operators can relay wireless enhanced 911 calls to PSAPs with position information, requiring no additional equipment at the PSAP.

Westinghouse has developed and is implementing a nationwide emergency response center which will improve personal and asset security, and reduce response time to medical and other public safety emergencies. Westinghouse intends to provide a nationwide emergency response and routing center enabling the delivery of wireless-based calls to the correct response agency. The alternative is to have each ground station or satellite service provide this routing service independently. The former approach is obviously more cost effective and controllable for changes in PSAP jurisdictions. The response center for cellular 911 is scheduled to be fully deployed by late 1995.

Enhanced 911 and the Mobile Satellite System

Westinghouse concurs with the commission's assertion that nationwide wireless enhanced 911 support can significantly enhance public safety nationwide. (Notice at Paragraph 37.) Wireless services have the capability technically to support essentially the same level of enhanced 911 access that the public has grown to expect from wireline systems. Technologies exist that can provide accurate location information and subscriber information to emergency response personnel. When and how these enhanced services are employed should be based on market and economic conditions, and thus offered at the discretion of the service provider. Market forces should prevail. If the end-user customer expects, and is willing to pay for such enhanced service, then successful service providers should be prepared to offer their customers that preferred service.

Enhanced 911 services need not be limited to real-time voice services as suggested by the Commission. (Notice at Paragraph 38.) Two-way Mobile Data Services that provide real-time messaging capability could provide 911 access.

For mobile satellite systems two dimensional location information will only be available in outdoor or remote fixed site implementations. A coupling of satellite services with in-building pico-cell wireless systems would be a hybrid solution capable of supporting accurate multi-story in building location.

911 Availability

The Commission has asked for information on allowing the mobile terminal to be used outside the assigned area of coverage for the subscriber. (Notice at Paragraph 41.) The Westinghouse system is designed to allow interoperability between terrestrial, cellular, and satellite modes of call processing. Live call hand-off from a cellular mode to satellite mode is part of the current design and implementation. The system is designed using industry standard protocols for PSTN/PN and cellular networks. If appropriate agreements were in place across all terrestrial organizations and cellular organizations, it would be possible to modify the design to allow mixed mode mobile terminals to participate in a "universal 911" service.

Regarding nationwide access to enhanced 911 services even in roaming regions, nationwide Emergency Response Centers should be implemented as an intermediate function that would route and connect callers to the appropriate PSAP. Service centers such as this already exist in support of home security and roadside services. These service centers are well equipped to support huge geographic information and subscriber databases. Furthermore, assigned personnel are well accustomed to dealing with emergency situations.

911 Call Priority

Westinghouse believes that all priority for enhanced 911 services can be supported in proposed and soon to be implemented voice and data wireless systems. (Notice at Paragraph 44.)

User Location Information

The most important aspect of the 911 service is to determine the exact physical location of the individual in need of assistance. (Notice at Paragraph 45.) For a satellite based system, the Notice stage one and stage two requirements regarding base station location and/or antenna sector have no added value (e.g. a mobile terminal on the west coast may enter the terrestrial base station at an east coast location). There is significant impact on the design and resulting cost of the mobile terminal if Rules are enacted so as to mandate inclusion of some type of

position location determination capability into every mobile radio unit including mobile satellite terminals. With GPS receivers costing on the order of several hundreds of dollars, any imposition by the Commission will have a significant effect on the resulting price of equipment to the end-user.

Westinghouse is concerned with the cost implications some of the proposed requirements may have on the development and modification of these solutions and the ultimate fact that the cost of these will be born by the end-user.

Regarding enhanced 911 for all wireless networks, Westinghouse believes that lives saved by inclusion of enhanced features, specifically the callers location, will require the following additional cost items:

- The inclusion of location devices such as GPS in the mobile terminal
- The inclusion of a modem or other digital transmission means in the mobile terminal
- The capacity of the PSTN and cellular networks to pass these digital location signals
- The hardware capacity of PSAPs or a routing center to receive these digital signals and relate them to text or map data. This requires the presence of a digital map database and the use of a Geographic Information System (GIS)

The Westinghouse designed mobile terminals does include a GPS capability as a purchase option. The GPS feature is implemented using commercially available printed circuit boards that interrogate the commercially available GPS. The accuracy of the position provided is limited by the commercially available GPS outputs. It is possible to enhance the Westinghouse mobile terminal and associated ground segment to transmit these coordinates as part of a 911 service call. The accuracy of position could be enhanced if as part of the future 911 service thrust more accurate GPS coordinates were made available to the commercial domain.

Commercial GPS accuracy is the limiting factor with regard to the Notice phase three requirement in terms of latitude and longitude. The in-building requirement which specifies three dimensional location is an issue that at this time is considered non-resolvable within the Westinghouse system context. However, if the issue is approached as a total system issue, it may be appropriate to implement ancillary locator systems, within large buildings that respond to frequencies reserved for emergency conditions. These frequencies could be used to process an emergency beacon interrogation system which is initiated as part of the 911 entry. Thus, a "search and rescue" team could be equipped with a portable interrogation device to locate the beacon transmitter emitting from the mobile radio device. In summary, three dimensional locations are a key system issue that may require a more global systematic solution for satellite based communication systems that may introduce significant cost to the market place directly or indirectly. A minimum of five years should be the necessary timeline for incorporation.

Re-ring/Call Back

Westinghouse supports the call-back feature for wireless enhanced 911 calls. (Notice at Paragraph 52.) However, adding this feature may impact cost regarding developments and upgrading. Moreover, this requirement, or others, should not be grandfathered so as to have to recall all operational units to provide that upgraded feature. The three year timeline is sufficient.

Access to Text Telephone Devices (TTY)

Allowing 911 calls from a phone via TTY should be a major concern. Most mobile satellite systems as currently implemented provide for an alternating voice or data call setup. The data mode would be appropriate for an individual with a speech or hearing impairment. The requirement for minimum 911 dialing may be an issue. This would require a special version of the mobile terminals oriented toward TTY communication as a first choice to minimize 911 dialing. Thus, the impact on the cost of TTY implementation is a concern.

Equipment Manufacture and Cost Considerations

As a developer and manufacturer of mobile satellite terminal equipment, the proposed requirements under consideration to be imposed on mobile radio transmitter equipment is of great concern to Westinghouse. Although the intent of the proposed rulemaking is honorable, the Commission must take into consideration the impact some of these requirements will have on the development and manufacturing of this equipment and the resultant increase in cost that will ultimately be born by the end-user. In general, it is Westinghouse's opinion that the marketplace should dictate what functionality and features the buying public wants. If the demand for these features is great enough, manufacturers will provide the feature or subsequently lose market share..

The cost of adding automatic location information (ALI) using today's available technology will result in a price increase, at retail, in the order of \$400-800 depending on the accuracy required. For terrestrial-based mobile radio transmitters, this will raise the price of equipment by 75-100% on average. For mobile satellite equipment, the price increase will be in the 25-30% only because of the inherently higher prices for mobile satellite equipment. These price increases will have detrimental impact on demand and future adoption rates by end-users. The Commission must be careful not to mandate a requirement that is needed in only those relatively few instances when location information must be automatically relayed to the PSAP because the caller is unable due to the consequences of the emergency. No data has been presented as to the percentage of 911 calls that require this automatic location information.

Westinghouse does believe the costs for ALI will decrease over time. Thus, the timeline for requiring this capability, if a requirement were to be imposed, should be out far enough in time so as to take advantage of this expected lower cost technology available in the next three to seven years.

As mentioned above, the Commission should take care in avoiding any grandfathering requirements that would require recall of fielded equipment.

The option of labeling the equipment in some non-obtrusive manner warning the user the answering party may not know the whereabouts of the calling party or be

able to call back the calling party is an acceptable alternative solution. Moreover, the same labeling information/warning should be included in the user manual since the equipment is usually installed out of sight of the user.

Conclusion

Westinghouse supports the need and usefulness for emergency 911 access. With its mobile satellite communications network and mobile terminal businesses and its value-added emergency response services capabilities, Westinghouse is positioned to satisfy the needs of the users of these wireless communications systems. Moreover, these users will ultimately dictate the level of service and access they require and at what price point they are willing to pay. Thus, the Commission must be careful in its mandates so as not to impose regulations that will adversely impact the economics of the design, evaluation, implementation and retrofitting of these systems. Westinghouse would be interested in research information that may be available through the various public safety agencies that give some sense of the frequency automatic location information is required to effectively employ emergency services. The Commission, as well as the public, should be aware the capabilities exist for these access features in the wireless networks and could be accommodated generally in the time frames addressed by the Commission. Therefore, the Commission should be flexible in its implementation approach to allow for the development of technology and realistic business plans for enhanced 911 service offerings.

Respectfully submitted,

Westinghouse Electric Corporation
Electronic Systems Group

Date: 1-9-95
January 9, 1995

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